

WHAT IS CLAIMED IS:

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1. A secondary-battery control circuit,  
comprising:  
a first path supplying a first load current  
from one or more secondary batteries connected in series  
or parallel, to a system, and including a first cutoff  
switch; and  
a second path supplying a second load current  
from said one or more secondary batteries to the system,  
wherein said first cutoff switch is turned off  
15 if a voltage of said one or more secondary batteries is  
lower than a first predetermined voltage, or if the  
first load current is greater than a predetermined  
current, thereby cutting off the first load current to  
the system.

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2. The secondary-battery control circuit as  
25 claimed in claim 1, wherein said second path includes a

second cutoff switch controlled independently of said first cutoff switch.

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3. The secondary-battery control circuit as claimed in claim 2, wherein said second cutoff switch is turned off if the voltage of said one or more secondary batteries is higher or lower than a second predetermined voltage.

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4. The secondary-battery control circuit as claimed in claim 2, further comprising:

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a first standard-voltage generating circuit generating a first standard voltage; a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries;

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a first comparing circuit comparing said first standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more

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5       secondary batteries are over-discharged;  
          a second standard-voltage generating circuit  
          generating a second standard voltage;  
          a first voltage detecting circuit detecting a  
5       voltage corresponding to a current flowing through said  
          one or more secondary batteries while said one or more  
          secondary batteries are being discharged; and  
          a second comparing circuit comparing said  
          second standard voltage with the voltage detected by  
10      said first voltage detecting circuit, to detect whether  
          an excess current flows through said one or more  
          secondary batteries,  
          wherein said first cutoff switch is controlled  
          based on outputs of said first comparing circuit and  
15      said second comparing circuit.

20           5. The secondary-battery control circuit, as  
          claimed in claim 4, further comprising:  
          a third standard-voltage generating circuit  
          generating a third standard voltage;  
          a third comparing circuit comparing said third  
25      standard voltage with the voltage of said one or more

secondary batteries, to detect whether said one or more secondary batteries are overcharged;

5 a fourth standard-voltage generating circuit generating a fourth standard voltage;

a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or more secondary batteries are being charged; and

10 a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

15 wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

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6. The secondary-battery control circuit as claimed in claim 1, wherein said system, to which the second load current is supplied through said second path, includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said

one or more secondary batteries, or a resetting IC used for resetting the system.

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7. A battery pack, comprising:  
one or more secondary batteries connected in  
series or parallel; and  
10 a secondary-battery control circuit,  
wherein said secondary-battery control circuit  
includes a first path supplying a first load current  
from said one or more secondary batteries to a system,  
and including a first cutoff switch; and a second path  
15 supplying a second load current from said one or more  
secondary batteries to the system, wherein said first  
cutoff switch is turned off if a voltage of said one or  
more secondary batteries is lower than a first  
predetermined voltage, or if the first load current is  
20 greater than a predetermined current, thereby cutting  
off the first load current to the system.

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8. The battery pack as claimed in claim 7,  
wherein said second path includes a second cutoff switch  
controlled independently of said first cutoff switch.

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9. The battery pack as claimed in claim 8,  
wherein said second cutoff switch is turned off if the  
10 voltage of said one or more secondary batteries is  
higher or lower than a second predetermined voltage.

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10. The battery pack as claimed in claim 8,  
wherein said secondary-battery control circuit further  
includes:

a first standard-voltage generating circuit  
20 generating a first standard voltage;  
a secondary-battery voltage detecting circuit  
detecting the voltage of said one or more secondary  
batteries;  
a first comparing circuit comparing said first  
25 standard voltage with the voltage of said one or more

secondary batteries, to detect whether said one or more secondary batteries are over-discharged;

5 a second standard-voltage generating circuit generating a second standard voltage;

10 a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

15 a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

20 wherein said first cutoff switch is controlled based on outputs of said first comparing circuit and said second comparing circuit.

25 11. The battery pack, as claimed in claim 10, wherein said secondary-battery control circuit further includes:

a third standard-voltage generating circuit generating a third standard voltage;

a third comparing circuit comparing said third standard voltage with the voltage of said one or more secondary batteries, to detect whether said one or more secondary batteries are overcharged;

5 a fourth standard-voltage generating circuit generating a fourth standard voltage;

a second voltage detecting circuit detecting a voltage corresponding to the current flowing through said one or more secondary batteries while said one or 10 more secondary batteries are being charged; and

15 a fourth comparing circuit comparing said fourth standard voltage with the voltage detected by said second voltage detecting circuit, to detect whether the excess current flows through said one or more secondary batteries,

wherein said first cutoff switch is controlled based on outputs of said third comparing circuit and said fourth comparing circuit.

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12. The secondary-battery control circuit as claimed in claim 7, wherein said system, to which the 25 second load current is supplied through said second path,

includes a remaining-charge indicating IC (Integrated Circuit) used for indicating a remaining charge of said one or more secondary batteries, or a resetting IC used for resetting the system.

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13. A portable device comprising:

10 a battery pack that includes one or more secondary battery connected in series or parallel, and a secondary-battery control circuit; and

15 a load circuit supplied with a load current from said battery pack,

20 wherein said secondary-battery control circuit includes a first path supplying a first load current from one or more secondary batteries connected in series or parallel to a system, and including a first cutoff switch; and a second path supplying a second load current from said one or more secondary batteries to the system, wherein said first cutoff switch is turned off if a voltage of said one or more secondary batteries is lower than a first predetermined voltage, or if the first load current is greater than a predetermined current, thereby cutting off the first load current to

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the system.

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14. The portable device as claimed in claim 13, wherein said second path includes a second cutoff switch controlled independently of said first cutoff switch.

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15. The portable device as claimed in claim  
15 14, wherein said second cutoff switch is turned off if  
the voltage of said one or more secondary batteries is  
higher or lower than a second predetermined voltage.

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16. The portable device as claimed in claim  
14, wherein said secondary-battery control circuit  
further includes:

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a first standard-voltage generating circuit

generating a first standard voltage;

a secondary-battery voltage detecting circuit detecting the voltage of said one or more secondary batteries;

5 a first comparing circuit comparing said first  
standard voltage with the voltage of said one or more  
secondary batteries, to detect whether said one or more  
secondary batteries are over-discharged;

a second standard-voltage generating circuit

10 generating a second standard voltage;

a first voltage detecting circuit detecting a voltage corresponding to a current flowing through said one or more secondary batteries while said one or more secondary batteries are being discharged; and

15 a second comparing circuit comparing said second standard voltage with the voltage detected by said first voltage detecting circuit, to detect whether an excess current flows through said one or more secondary batteries,

20 wherein said first cutoff switch is controlled  
based on outputs of said first comparing circuit and  
said second comparing circuit.

17. The portable device, as claimed in claim  
16, wherein said secondary-battery control circuit  
further includes:

5                   a third standard-voltage generating circuit  
generating a third standard voltage;

10                  a third comparing circuit comparing said third  
standard voltage with the voltage of said one or more  
secondary batteries, to detect whether said one or more  
secondary batteries are overcharged;

15                  a fourth standard-voltage generating circuit  
generating a fourth standard voltage;

20                  a second voltage detecting circuit detecting a  
voltage corresponding to the current flowing through  
said one or more secondary batteries while said one or  
more secondary batteries are being charged; and

25                  a fourth comparing circuit comparing said  
fourth standard voltage with the voltage detected by  
said second voltage detecting circuit, to detect whether  
the excess current flows through said one or more  
secondary batteries,

                      wherein said first cutoff switch is controlled  
based on outputs of said third comparing circuit and  
said fourth comparing circuit.

18. The portable device as claimed in claim  
13, wherein said system, to which the second load  
current is supplied through said second path, includes a  
remaining-charge indicating IC (Integrated Circuit) used  
5 for indicating a remaining charge of said one or more  
secondary batteries, or a resetting IC used for  
resetting the system.

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